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COLICS IN HORSES CAUSED BY PARASITES.

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Colics of horses and mules occur in Puerto Rico which are caused directly or indirectly by invasions of intestinal parasites. These colics are usually known as embolic and worm colics. The importance of this disease is not completely known, but this season especially, in many localities it was common and caused deaths among equines.

Dr. Roberts, the Veterinarian of the Virgin Islands Experiment Station in collaboration with Dr. A. T. Kinsley, Pathologist of Kansas City, Missouri, have found that most of the colics of equines in St. Croix are caused by worms. At that place these colics usually occur following the lighter rains during the rainy season. In Puerto Rico these colics seem to occur only as enzootics during the last of November and the first of December. Further investigation may show that colics caused by parasites are occurring sporadically throughout the year and are more common than suspected at present.

Symptoms of these colics are similar to those from other causes, with pain in the abdominal regions, usually appearing suddenly and without apparent cause. Bloating is a common symptom with considerable distention of the abdomen. One attack of a mild or severe colic, if death does not ensue, may be followed in a few hours, a few days or several days, by other attacks of either a mild or severe character. Repeated attacks of colic are characteristics of this disease.

The adult strongyle parasites apparently causing these colic conditions are located in the caecum and colon. Three species of large strongyles and several species of small strongyles have been found in equines in Puerto Rico. All the numerous round worms with the exception of the pin worm found in the large intestine belong to this group. Heavy infestations are common. The aneurisms which may result in embolic colic have been found in every autopsy made so far by us on horses. In one outbreak of colic during November 1931 on a farm located in San Sebastián the tapeworm *A. perfoliata* was suspected as an important contributing cause of this disease.

As all of the strongyles located in the large intestine of horses are closely related, it may be inferred that the life histories of all are similar to those species which are already partially known. The eggs pass out in the manure and hatch on the ground. Under favorable conditions in which moisture is essential, the resulting embryos develop and become infective. Apparently they are ingested by the horse through the forage and drinking water. Many of these larval forms after reaching the intestines penetrate the walls and wander more or less through the body tissues. Finally they return to the lumen of the intestine and develop to maturity.

The larval form of one species of the large strongyles enters the blood stream and may become attached to the intima of one of the large blood vessels supplying the intestines. This attachment in numbers causes a dilation (aneurism) of the vessel and the formation of a clot or thrombus. A portion of this clot may break off and become lodged in one of the smaller arteries (embolism) resulting in complete stoppage of the blood that supplies a portion of the intestine. If a collateral circulation is not established or does not suffice there occurs a paralysis of this portion of the intestine. This condition is called embolic colic.

The adult worms are bloodsuckers and thus cause anemia and emaciation of the host. The wandering habits of hundreds and perhaps thousands of these larval forms cause injury to the intestinal walls and to the liver and other organs concerned with digestion. Dr. Roberts believes that these wandering larval forms are the important cause of many cases of these colics. The occurrence of these colics in enzootics about the time these larvae are most numerous tends to support this assertion. Dr. Kinsley has also advanced the theory that the presence of the thrombi may reduce the normal amount of blood passing to portions of the intestines and thus predispose the animal to indigestion and colic. If true this theory explains the primary cause of many colics in which the causal factors have heretofore remained obscure. All these pathological changes singly or acting together at times produce an acute condition in which colic is the predominant symptom.

In regions similar to that of Mayaguez, the ova and infective larvae on the ground are apparently washed down and carried off by the heavy rains of the summer months. However, following the heavy rains, there is an abundance of moisture for their development, and this is the period of greatest danger. Later during the dry winter season the lack of moisture is fatal to them. Theoretically the beginning of the rainy season before the heavy washing rains commence is a period of danger but as far as known the colics do not appear at this time. Under unsanitary conditions infestation may occur at any time during the year.

The common practice of placing the forageⁱⁿ piles on the ground in corrals is a source of danger even during the dry season. The unconsumed grass which holds moisture becomes mixed with manure and enables the free living stages of strongyles to maintain their vitality for a long time, even for a period of several months. As soon as even a light rain may occur these larval forms come to the surface, infest the fresh forage spread on top and are ingested by the horse. This seems to be the important source of infestation in St. Croix.

Dr. Roberts who has had considerable experience in treating these colics states that the administration of a purgative as soon as possible is essential. The owner or manager should have Epsom or similar salts available and should drench the animal immediately. Food should be withheld. The veterinarian should be called at once and a rapid acting purgative administered. Further treatment should depend on the symptoms. If treatment is delayed and serious symptoms are apparent, the purgative should be withheld and narcotics used to relieve the pain and suppress violent peristalsis.

Preventive or control measures are most important. The indicated measures include the administration of anthelmintics to remove the worms, and also the taking of precautions to lessen or eliminate the sources of infestation. Careful control measures should not only prevent the occurrence of these colics but also should improve the general condition of the animals.

First the animals should be fed from tight feeding racks or mangers at all times. The corrals should be kept free of manure and debris. It should be emphasized that even though care is taken to provide fresh clean forage, if this is spread on the ground in the corrals it may become contaminated with the infective larval forms even during the dry season. Actually under this system the horses are being fed off the top of a manure pile and it is a very dangerous practice especially in a climate so favorable to parasites as that of Puerto Rico.

Immediately following the heavy rains of the summer for a period of from 6 to 8 weeks the animals should be fed on forage cut from the higher and well drained fields instead of from the banks and ditches of cane fields, or from river bottoms and other low areas as is the common practice. Animals should be kept away from wet and marshy pastures during this period. They should never be allowed to drink from stagnant pools. The feeding of elephant grass or cane tops at this time is an excellent practice. If manure from horses infested with parasites is spread on grass fields it should be plowed under to bury and destroy the eggs and larvae.

After several weeks of dry weather the forage from the lowland areas apparently becomes safe for feeding. In Mayaguez with a normal rainfall of approximately 10 inches during both September and October, dropping to 6 inches in November and 2.5 inches in December, the period of greatest infestation seems to occur during November. After December 15th the amount of infestation is apparently greatly reduced, and after January 1st this probably reaches a minimum. Thus under normal conditions in Mayaguez and other localities with a similar rainfall special attention should be given the source of forage or the location of the pasture from November 1st up to at least December 15th.

Drugs are available that will eliminate the adult parasite in the horse. Infested horses should be fasted for 36 hours and then treated with oil of *Shenopodium* or carbon tetrachloride. The doses recommended here are for animals weighing approximately 1000 pounds. For horses weighing less than this the dose should be graduated accordingly.

Carbon tetrachloride is about 100 percent effective for the large strongyles but only about 50 percent efficient for the small strongyles. The dose is 6 to 12 fluid drams (25 to 50 cc.). This drug should be given in capsules. If this drug is used only 3 or 4 animals should be treated at first to determine their tolerance towards it.

Oil of Chenopodium has an efficiency of nearly 100 percent for both the large and small strongyles. The dose is 4 to 5 fluid drams (16 to 20 cc.). This drug may be given in capsules or by stomach tube. It should be followed immediately by one quart of raw linseed oil or by an aloes ball. It should never be given to pregnant mares.

Because of the heavy infestations occurring in many localities it may be necessary at first to administer anthelmintics more than once a year. If more than one treatment is necessary these two drugs may be alternated.

For the present if no new cases of colics are appearing the anthelmintic treatment should be given as early as possible to each animal in the herd. Following an effective treatment for worms the extent of reinfestation can be determined rather accurately by making a microscopic examination of the feces for worm ova. Also this reinfestation may be checked roughly by weighing the animals once or twice a month. As there are variations in weights of individuals the average weights of several animals should be taken. A gradual loss in weight of a group of animals without apparent external causes would indicate intestinal parasitism.

